PATENT ABSTRACTS OF JAPAN

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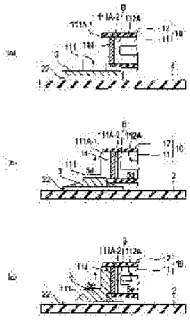
(54) ELECTRONIC COMPONENTS AND MANUFACTURING METHOD



(57)Abstract:

PROBLEM TO BE SOLVED: To prevent welding brazing agent from creeping up.

SOLUTION: A material or a foundation plating layer of a contact for an electronic component is constituted with low-wettability matter of welding brazing agent, on the surface of which, a finishing plating layer is formed constituted with high-wettability matter of the welding brazing agent. Then, a region is formed where a low-wettability material surface or a foundation plating layer surface is exposed, by selectively removing a part of region of the high- wettability finishing plating layer, and this exposed region is used as one for preventing heated and melted welding brazing agent from creeping and moving up along the high-wettability finishing plating layer.

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CLAIMS

[Claim(s)]

[Claim 1] They are the electronic parts possessing contact with the terminal area and the contact section by which brazing and soldering are carried out. The above-mentioned contact The finishing deposit which consisted of a material with the low wettability front face to a welding solder agent, and matter which was formed on the front face of the above-mentioned material, and had the high wettability to a welding solder agent, It has the field where the low wettability front face of the above-mentioned material of the high wettability finishing deposit of a terminal area which removed the field alternatively in part and was set up was exposed, and is characterized by for a welding solder agent creeping up and using the field where this low wettability front face of the above-mentioned material was exposed as an inhibition field.

[Claim 2] It is the electronic parts indicated by claim 1, and the substrate deposit which consisted of matter with the low wettability to a welding solder agent is formed on the above-mentioned material, the above-mentioned finishing deposit is formed on this substrate deposit, and the thing of the above-mentioned finishing deposit for which the field was removed alternatively in part, the substrate deposit was exposed, and the above-mentioned inhibition field was formed carries out as the description so that the above-mentioned low wettability front face may be constituted.

[Claim 3] It is the electronic parts indicated by claim 2, and is characterized by the substrate deposit by which the above-mentioned material was constituted from a conductor and formed on this material being a nickel alloy deposit.
[Claim 4] the electronic parts indicated by claim 2 -- it is -- the above-mentioned material -- un--- it consists of conductors and the substrate deposit formed on this material is characterized by being the nickel alloy deposit formed by the electroless deposition technique.
[Claim 5] It is the electronic parts indicated by claim 1, and it consists of matter in which the above-mentioned material had the low wettability to a welding solder agent, the above-mentioned finishing deposit is formed on a material, and it is characterized by the thing of the above-mentioned finishing deposit for which the field was removed alternatively in part, the material was exposed, and the above-mentioned inhibition field was formed.
[Claim 6] it is the electronic parts indicated by claim 1, it consists of matter in which the above-mentioned material had the low wettability to a welding solder agent, a substrate deposit is formed on the above-mentioned material, and the above-mentioned finishing deposit forms on this substrate deposit -- having -- a part of the above-mentioned finishing deposit -- a part of field and the above-mentioned substrate deposit -- it carries out having removed a field alternatively, having exposed the above-mentioned material, and having formed the above-mentioned inhibition field as the description.
[Claim 7] It is the manufacture approach of electronic parts equipped with contact with the terminal area and the contact section by which brazing and soldering are carried out. It constitutes from matter with low wettability [as opposed to a welding solder agent for the material of the above-mentioned contact]. The finishing deposit constituted from matter which had the high wettability to a welding solder agent on this material is formed. A field is alternatively removed with a mechanical processing technique in part, the exposed region of a low wettability material is formed, and it is characterized by the thing of the high wettability finishing deposit of a terminal area for which a welding solder agent

creeps up and the exposed region of this low wettability material is used as an inhibition field.

[Claim 8] It is the approach indicated by claim 7, and the substrate deposit which had the high wettability to a welding solder agent on the above-mentioned material in advance of formation of the above-mentioned finishing deposit shall form, the above-mentioned finishing deposit shall form on the above-mentioned substrate deposit, and the above-mentioned exposed region carries out the thing of the finishing deposit of a terminal area for which the part was considered as the thing of a field and a substrate deposit which removes a field alternatively with a mechanical processing technique in part as the description.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the new approach of forming the field which the welding solder agent which creeps up crawls on the finishing deposit top which is the high wettability coat of the welding solder agent formed in that front face in contact, and prevents a riser in it, and electronic parts with

this inhibition field especially about electronic parts with the contact for brazing and soldering, and its process.

[0002]

[Description of the Prior Art] The conventional example is explained with reference to drawing 1 and 2. Electronic parts 10 consist of contact 11 and the terminal attachment component 12 which consists of the insulating material which carried out mold molding and held this contact 11 to one, and contact 11 changes from the contact section 112 which contacts electrically the terminal area 111 by which solder attachment is carried out, and other electronic parts to through tube deposit 21A formed in the inner circumference section of the through tube 21 formed in the wiring substrate 2. 3 shows the welding solder agent like the solder beforehand given to the brazing-and-soldering pad 22 of wiring (not shown) formed in the inferior surface of tongue of the wiring substrate 2.

[0003] The tin or gold whose terminal area 111 of contact 11 is the high wettability matter of a welding solder agent on the front face is plated. Where this terminal area 111 is inserted in the through tube 21 with deposit 21A of the wiring substrate 2 (drawing 1), by carrying out heating fusion of the welding solder agent 3 given to the inferior surface of tongue of the wiring substrate 2, a terminal area 111, through tube deposit 21A, and the brazing-and-soldering pad 22 are electromechanically connected by brazing and soldering, and an electric terminal 1 is mounted in the wiring substrate 2, and constitutes electronic parts 10. on the occasion of this solder attachment, the welding solder agent 3 which carried out heating fusion is sucked up, wetting a deposit with wettability with the high front face of a terminal area 111 (the following -- this -- "-- creeping up -- " -- ** -- it calls), and the amount of the welding solder agent 3 in the junction field between a terminal area 111 and through tube deposit 21A decreases. If the count of heating also attains to multiple times, welding solder agents will come to run short and the electromechanical connection between a terminal area 111 and through tube deposit 21A will become imperfect.

[0004] In order to solve the problem of a welding solder agent which originates in creeping up and runs short of the welding solder agents between a terminal area 111 and the plating through tube 21, as it is shown in drawing 1 and 2 as a plan on the other hand, creeping up to some fields of the terminal area 111 of contact 11, and forming the oxide coat field 113 for inhibition is performed (it is JP,8-213070,A for details refer to). Namely, the tinning layer front face which forms the high wettability field of the terminal area 111 of contact 11, Or form the coat field 113 where it was some fields of a gold plate layer front face, and forcible oxidation of the part which a melting solder agent creeps up and reaches was carried out band-like, and the surface layer matter oxidized, and this field is made into the low wettability field which does not get wet in the welding solder agent 3 which carried out heating fusion. It is considering as the field which the welding solder agent 3 which carried out heating fusion cannot cross.

[0005] however, a ****** [that oxide skin formation processing is actually performed to the front face of the tinning layer put on the front face of a terminal area 111, or a gold plate layer since this oxide coat is what / only / the oxygen atom combined with the atom of the tin which constitutes a surface, or the golden atom] -- or it cannot check by viewing whether oxide skin formation processing is performed to the proper location of a terminal area 111, the configuration, and the dimension. As other technique of solving the problem which runs short of the welding solder agents of the terminal area of contact As shown in drawing 3 a - 3c, after forming nickel-plating layer 11A as a substrate layer all over contact 11 Predetermined spacing (0.3mm) is vacated between the contact section 112 and a terminal area 111. In the contact section 112, it is thick (0.4(m) gold plate 112A is given, and it is thin (0.05(m) gold plate 111A is given) as an object for solder attachment in a terminal area 111). There is the conventional example which the solder agent which fused outcrop 11B of the nickel-plating layer left behind among both as nickel oxide layer 113' by anodic oxidation creeps up, and is formed as an inhibition field (it is JP,10-247535,A for details refer to).

[0006] Without the ability of the welding solder agent 3 which is a low wettability

field and carried out heating fusion exceeding, it creeps up more than this and this nickel oxide layer 113' is not moved, either. However, in the conventional example of drawing 3 a - 3b, it is difficult to form the width of face of this nickel oxide layer 113' in narrow width of face of less than 0.2mm. Processing it using a liquid (plating and spreading processing) has a low precision of its location and range, and especially the precision of the formation location of a plating field needs to mask using a tape or a fixture in adjusting an oil level ****, and it is difficult to perform processing stabilized in tolerance 1mm or less.

[0007] namely, the location of the nickel oxide layer formed and the precision of width of face -- solder attachment of the processing location precision of the gold plate layer of the contact section 112, and a terminal area 111 -- public funds -- since it is influenced of the processing location precision of a deposit, when terminal length is detailed contact of 2mm or less, it becomes scarce highly at mass-production nature. Furthermore, the formed oxide coat cannot check by viewing whether the processing is performed. processing of the nickel oxide layer by anodic oxidation -- the gold plate layer of the contact section 12, and solder attachment of a terminal area 111 -- public funds -- the same problem is produced also when carrying out in advance of formation of a deposit.

[0008] Furthermore, it explains below that there is a problem also by contact of other formats. It is the conventional example which this forms the brazing-and-soldering pad 22 in the front face of the wiring substrate 2 with reference to drawing 4 a, lays the welding solder agent 3 on the brazing-and-soldering pad 22, carries out melting heating of this welding solder agent 3, and carries out the brazing and soldering of the terminal area 111 of contact 11 to the brazing-and-soldering pad 22. If heating melting of the welding solder agent 3 is carried out, the welding solder agent 3 fused as shown in drawing 4 b is sucked up wetting surface 111A of a terminal area 111, and as shown in drawing 4 c, in the case of the conventional example shown in drawing 4 a, surface 112A of the contact section 112 is also reached, it wets the front face, and runs short of the amounts of the welding solder agent 3 in the junction field between a terminal area 111

and the brazing-and-soldering pad 22 so much. In addition, in drawing, B is the boundary line of both the front faces 111A and 112A.

[0009]

[Problem(s) to be Solved by the Invention] In the conventional example shown in drawing 1 and 2, the formed oxide coat has the fault that it cannot check by viewing whether the processing is performed. In the conventional example shown in drawing 3 , the precision of the formation location of a plating field is low, and it is difficult to perform stable processing, and, in detailed contact, becomes scarce to mass-production nature. Moreover, the formed oxide coat cannot be checked by viewing. The amounts of the welding solder agent 3 run short in the conventional example shown in drawing 4 . Thus, in the conventional example shown in drawing 1 -4, the welding solder agent 3 crept up and it explained that the problem was not solved.

[0010]

[Means for Solving the Problem] This invention offers the electronic parts which the above-mentioned welding solder agent crept up, and solved the problem, and its new process. As one viewpoint of the invention in this application, form a terminal area and the contact section in the material of contact 11, and the low wettability front face to the welding solder agent 3 is given. The finishing deposit constituted from high wettability matter to the welding solder agent 3 is formed on the front face. Remove alternatively a part of high wettability finishing deposit of the terminal area 111 to which the fused solder agent creeps up, and the outcrop 114 of the low wettability front face of a material is formed. The improved contact 11 which was constituted so that a play might be given as the inhibition section which the solder agent which fused this outcrop crawls and prevents a riser is obtained, brazing and soldering are carried out to a substrate using this improved contact 11, and electronic parts 10 are constituted.

[0011] As other one viewpoint of the invention in this application, the material of contact 11 is constituted from low wettability matter to the welding solder agent 3. A part of high wettability finishing deposit of the terminal area 111 to which a

substrate deposit is formed on this material, the finishing deposit constituted from high wettability matter to the welding solder agent 3 is formed in that front face, and the fused solder agent creeps up Remove alternatively a part of both of the substrate deposit under it, and the outcrop 114 of the material of the low wettability matter is formed. The improved contact 11 which was constituted so that the solder agent which fused this outcrop might creep up and a play might be given as the inhibition section is obtained, brazing and soldering are carried out to a substrate using this improved contact 11, and electronic parts 10 are constituted.

[0012] And as a component of a material, when the solder agent which was made to expose material 11X of contact 11, and carried out [above-mentioned] fusion creeps up and it forms the inhibition section, although the copper alloy (additives, such as P and Si, may also be included) of Cu, and Ti, Be, Sn, Mg, nickel and Zn is usable in Cu and a list, metals, such as Co, Mn, Pb, aluminum, Fe, and SUS, are also usable. Finishing plating performed to the front face of contact 11 has tin alloy plating with gold plate, tin or Sn, Ag, Sn, Cu and Sn, and Cu and Ag, lead or lead alloy plating with Pb and Sn, Pd, Pd and nickel, or usable Pd alloy of Pd and Co.

[0013] Moreover, the substrate deposit which consists of the nickel alloy deposit of nickel for supporting covering of a finishing deposit, P, nickel and S, or nickel and B is formed on a material before formation of a finishing deposit as a viewpoint of further others of the invention in this application. And the finishing deposit of the high wettability matter is formed on this substrate deposit. Since the quality of the material of this substrate deposit is the electrical conducting material which had low wettability to the welding solder agent 3, only a finishing deposit can be removed, a substrate deposit can be exposed, the solder agent which carried out [above-mentioned] fusion by the outcrop of this substrate deposit can creep up, and it can also form the inhibition section.

[0014] In this case, since not only an electrical conducting material but charges of a nonconductive material, such as plastics, ceramics, and glass, can be used as

a component of a material The contact which had the contact section and a terminal area by molding using these ingredients is formed beforehand. after forming the electroless deposition layer of a nickel alloy and forming a finishing gold plate layer on it by electroless deposition all over the front face on the whole surface -- a part of finishing deposit of a terminal area -- removing -- the outcrop of a substrate layer -- with -- **** -- a solder agent creeps up and the inhibition section is formed. Moreover, when the substrate deposit constituted from high wettability matter is formed on the material constituted from an electrical conducting material with low wettability and a finishing deposit is formed on it, the both sides of a finishing deposit and a substrate deposit are removed, and an outcrop 114 is obtained.

[0015] Processing which removes alternatively a part of plating field of the high wettability matter formed in the front face of contact 11, and forms the outcrop 114 of a low wettability front face applies mechanical cutting or a mechanical polish technique, an electron discharge method or an electron-beam-machining technique, and a laser-beam-machining technique to the plating field of the high wettability matter in which the low wettability surface outcrop 114 should be formed. This processing technique can be easily carried out in a good processing location precision.

[0016]

[Embodiment of the Invention] It explains with reference to the electronic parts which showed the gestalt of implementation of this invention to drawing 5 - drawing 9 R> 9. In addition, the same notation is attached about the same object as what was shown in the conventional example. As the perspective view showed to drawing 6 (f), electronic parts 10 consist of contact 11 and insulator housing 12. The brazing-and-soldering pad 22 is formed in the front face of the wiring substrate 2. Like common knowledge, printed wiring (not shown) was prepared in this wiring substrate 2, and it has combined with the brazing-and-soldering pad 22. In addition, like drawing 1 , printed wiring is prepared in the rear face (it sets to drawing and is the substrate 2 bottom) of a substrate, and

you may constitute so that it may combine with the brazing-and-soldering pad on the front face of a substrate through a through tube and a through tube deposit.
[0017] And brazing and soldering are carried out to the brazing-and-soldering pad 22 of the front face of the wiring substrate 2 by laying the terminal area 111 of the contact 11 of electronic parts 10 through the welding solder agent 3 like solder on the brazing-and-soldering pad 22, and carrying out melting heating of this welding solder agent 3. In constituting the material of contact 11 from a conductor, it constitutes from a copper alloy. Finishing plating performed to the front face of contact 11 consists of any of gold plate, tin or tin alloy plating, lead, or lead alloy plating they are. And in order to make good adhesion of finishing plating to the metallic material which constitutes contact 11 in advance of finishing plating, substrate deposit 11A formed in the front face of material 11X is taken as a nickel alloy deposit.
[0018] When a part of finishing deposit is removed and the nickel alloy deposit of a substrate is exposed, it is checked experimentally that the melting welding solder agent 3 crawls on it by natural oxidation even if it does not make it oxidize compulsorily, since a nickel alloy deposit is low wettability during removal processing of a surface layer essentially, and a riser is prevented. For this reason, a check of oxide skin formation is not needed. Furthermore, the outcrop 114 of the low wettability matter is a part near [in a part of finishing deposit 111A for brazing and soldering formed in the front face of the terminal area 111 of contact 11] the contact section 112, it is a band-like configuration, and forms in the field to which a solder agent creeps up conventionally at a predetermined width method, and the finishing deposit of a terminal area is set to 111A-1 and 111A-2 by this outcrop for 2 minutes.
[0019] The 1st example of this contact is shown in drawing 5 - drawing 6 . With reference to drawing 5 (a), the welding solder agent 3 is laid in the brazing-and-soldering pad 22 formed in the front face of the wiring substrate 2, and this shows the condition of not heating [the terminal area 111 of contact 11 to which finishing plating was performed on welding solder agent 3 front faces was made

to engage with]. Drawing 5 (b) shows the place which began to creep up while the fused welding solder agent 3 wet the front face of a terminal area 111. In addition, in this example, a terminal area 111 and the contact section 112 are shown as what changes the quality of the material and plating thickness of finishing deposit 112A of the contact section 112 with the quality of the material of finishing deposit 111A of a terminal area 111, and plating thickness, therefore has a boundary line B between terminal area 111 finishing deposit 111A and finishing deposit 112A of the contact section 112 so that the contact section 112 may contact the exterior more at fitness.

[0020] Drawing 6 (d) is a sectional view in the 5d-5d line of drawing 5 (b). Drawing 5 (c) shows that the fused welding solder agent 3 cannot wet the front face of a terminal area 111, cannot reach the low wettability outcrop 114 by this invention, and cannot exceed this, and the fused welding solder agent 3 creeps up more than this, and does not move it. Drawing 6 (e) is a sectional view in the 5e-5e line of drawing 5 (c). the amounts of the welding solder agent 3 in the junction field between a terminal area 111 and the brazing-and-soldering pad 22 running short here, since the melting welding solder agent 3 which arrived at all the front faces of a terminal area 111 creeps up contact section 112 front face further with reference to drawing 4 (c) when the low wettability outcrop 114 does not exist like the conventional example, but forming the low wettability outcrop 114, if it depends on the invention in this application -- this -- being the further -- it creeps up and migration is prevented.

[0021] Drawing 7 (g) Various kinds of formation approaches of an outcrop 114 are shown in - (k). the case where substrate deposit 11A which consisted of low wettability matter is here exposed as an outcrop 114 -- it is -- in this case -- the quality of the material of a material -- a conductor -- un--- a conductor is fair and all matter can be used. In this example, a part of field 111A of a terminal area 111 is alternatively removed to band-like among the finishing deposits which consisted of high wettability matter formed in the front face of contact 11, the substrate deposit of a terminal area 111 is exposed, and the low wettability

outcrop 114 is formed.

[0022] Drawing 7 (g) shows the case where finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 formed in the same quality of the material and the same thickness, and form the outcrop 114 of a substrate deposit in the field of finishing deposit 111A of a terminal area 111. In this case, a boundary line B does not exist in fact. Drawing 7 (h) shows the case where formed more thinly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and the outcrop 114 of a substrate deposit is formed in the field of finishing deposit 111A of a terminal area 111. (This drawing is the same as drawing 6 (d))

Drawing 7 (i) shows the case where formed more thickly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and the outcrop 114 of a substrate deposit is formed in the field of finishing deposit 111A of a terminal area 111.

[0023] Drawing 7 (j) shows the case where formed more thickly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and the outcrop 114 of a substrate deposit is formed in the field of finishing deposit 112A of the contact section 112. Drawing 7 (k) shows the case where formed more thinly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the

contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and the outcrop 114 of a substrate deposit is formed in the field of finishing deposit 112A of the contact section 112.

[0024] Drawing 8 (l) - (p) removes alternatively in part the substrate deposit both which is the case where material 11X with a low wettability front face is exposed as an outcrop 114, and is formed in the finishing deposit of a terminal area 111, and the bottom of it, and exposes the front face of a material. In this case, although the quality of the material of a material has the desirable conductor of low wettability, it is also possible to use [which comes to have low wettability according to a removal process in part] the matter of the deposit by laser radiation, for example. Moreover, the quality of the material of a substrate deposit does not have limitation in the wettability.

[0025] Drawing 8 (l) shows the case where formed in the same quality of the material and the same thickness, and finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 removed both the substrate layers the field of finishing deposit 111A of a terminal area 111, and under it in part, and form the outcrop of material 11X. In this case, a boundary line B does not exist in fact. Drawing 8 (m) shows the case where formed more thinly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and removed both the substrate layers the field of finishing deposit 111A of a terminal area 111, and under it in part, and the outcrop 114 of material 11X is formed.

[0026] Drawing 8 (n) shows the case where formed more thickly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind,

and removed both the substrate layers the field of finishing deposit 111A of a terminal area 111, and under it in part, and the outcrop 114 of base 11X is formed. Drawing 8 (o) shows the case where formed more thickly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and removed both the substrate layers the field of finishing deposit 112A of the contact section 112, and under it in part, and the outcrop 114 of base 11X is formed.

[0027] Drawing 8 (p) shows the case where formed more thinly than the thickness of finishing deposit 112A of the contact section 112 the thickness of finishing deposit 111A of a terminal area 111 even if finishing deposit 111A of a terminal area 111 and finishing deposit 112A of the contact section 112 were the quality of the materials or the same quality of the materials of a different kind, and removed both the substrate layers the field of finishing deposit 112A of the contact section 112, and under it, and the outcrop 114 of base 11X is formed. In addition, in these drawing 7 or drawing 8 , it could be easily understood by deleting only a finishing deposit that the outcrop 114 of material 11X can be formed, when a substrate deposit does not exist.

[0028] Moreover, by the invention in this application, it could also be understood that the removal approaches other than this can also be used, although the removal approach of the finishing deposit by the exposure of laser light was indicated, in order to form the outcrop 114 of a low wettability front face. Moreover, the location which forms an outcrop 114 here, and its configuration are not restricted to band-like, either. For example, as shown in drawing 9 (q) - (s), forming in the field of a terminal area 111 is desirable.

[0029] In addition, as shown in drawing 9 (s), also by forming the field where the high wettability finishing deposit used as the passage of the brazing filler metal which formed two or more outcrops and was left behind between the adjacent

outcrops was narrowed, a brazing filler metal can crawl substantially and a riser can be prevented. If that discontinuity was narrowed, creeps up and forms the field, without similarly going around continuously completely although going around a terminal area 111 is desirable even if this outcrop 114 is the case where it is formed in band-like even if discontinuous, it creeps up and there is effectiveness of inhibition.

[0030] Other examples of the invention in this application are shown in drawing 10 . This example improves contact of the conventional example shown in drawing 3 . (Drawing 10 (a)) Also in this example, the same object as what was shown in other drawings attaches the same sign. So that it may be made to expose as outcrop 11B with predetermined spacing (0.3mm), after forming substrate layer 11A of a nickel-plating layer in the material front face of contact 11 using a plating technique, as this conventional example mentioned above Only the above-mentioned predetermined spacing is vacated and it is [for the contact sections 112] thick (it is [0.4(m) gold plate section 112A and for terminal area 111 solder attachment] thin (0.05(m) gold plate section 111A is formed (drawing 3 (b)))). Nickel oxide layer 113' is formed for the outcrop of the account nickel-plating layer of Gokami by anodic oxidation (drawing 3 (c)). It sets to the invention in this application to a melting solder agent creeping up and using this as an inhibition field. As shown in drawing 10 (b), after forming substrate layer 11A in the front face of contact material 11X, gold plate section 111A for solder attachment is formed in gold plate section 112A for contact, and a terminal area 111 side at the contact section 112 side. At this time, vacating only predetermined spacing like the conventional example does not require among both.

[0031] Subsequently, as shown in drawing 10 (c), a laser-beam-machining technique is applied to the field near the contact section of gold plate section 111A by the side of a terminal area, gold plate section 111A is removed, substrate layer 11A is exposed, and the low wettability outcrop 114 is formed so that it may go around a terminal area front face to band-like. Thereby, gold plate

section 111A is set to two partial 111A-1 and 111A-2 for 2 minutes. Although this solder agent 3 creeps up one side 111A-1 of the terminal area side gold plate section carried out for 2 minutes when the substrate 2 which had a through tube 21, through tube deposit 21A, and the welding solder agent 3 like drawing 2 is equipped with this contact and the solder agent 3 is fused As shown in drawing 10 (d), another side 111A-2 beyond it of the terminal area side gold plate section which it crawled, and the riser was prevented and was carried out for 2 minutes, and contact section side gold plate section 112A are not reached by the low wettability outcrop 114.

[0032] In addition, the formation location of the low wettability outcrop 114 may be formed in the junction field of terminal area side gold plate section 111A and contact section side gold plate section 112A, or may be formed in the field near the terminal area of contact section side gold plate section 112A.

[0033]

[Effect of the Invention] In contact of electronic parts, by removing alternatively the wettability high surface layer to that welding solder agent in part, and exposing a substrate deposit or a base with the front face of low wettability, the outcrop 114 of a low wettability front face can be formed, a welding solder agent can crawl, and, according to this invention, a riser can be prevented in that part. in addition, the thing in which the substrate deposit was united with the material although the substrate deposit had so far been explained as another object in the explanation which says a material as what has a low wettability front face -- with -- **** -- a material can also be considered. According to this idea, the front face of a substrate deposit can define it as the front face of a material.

[0034] By not receiving effect in substrate plating and finishing plating process tolerance, but carrying out a measurement setup of the proper low wettability outcrop formation location directly from the module of contact, and applying a previous processing technique there also about the formation location precision and width-of-face precision of an outcrop of this low wettability front face, the removal location and range of a high wettability coat can be processed with high

degree of accuracy, and a low wettability outcrop can be obtained. Moreover, like plating and spreading, like removal of a high wettability coat, the processing technique of dealing with a solid-state raises the location precision and the precision of the range upwards, is a suitable technique and can improve mass-production nature as compared with a processing technique with a liquid. Furthermore, since the location and range of a low wettability outcrop which carried out removal formation can be checked easily visually, a dimensional control can also be enforced easily and its mass-production nature improves.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing explaining one conventional example.
[Drawing 2] The partial enlarged drawing of drawing 1
[Drawing 3] Drawing explaining other conventional examples.
[Drawing 4] being the further -- others -- drawing explaining the conventional example.
[Drawing 5] Drawing explaining one example of this invention.
[Drawing 6] Drawing which explains the example of this invention further.

[Drawing 7] Drawing which explains the example of this invention further.

[Drawing 8] Drawing which explains the example of this invention further.

[Drawing 9] Drawing which explains the example of this invention further.

[Drawing 10] Drawing explaining other examples of this invention.

[Description of Notations]

2 Wiring Substrate

3 Welding Solder Agent

10 Electronic Parts

11 Contact

11A Substrate nickel-plating layer

11B The outcrop of a substrate nickel-plating layer

11X Material

12 Terminal Attachment Component

21 Through Tube

21A Through tube deposit

22 Brazing-and-Soldering Pad

111 Terminal Area

111A, 111A-1,111A-2 Terminal area deposit

112 Contact Section

112A, 112A-1,112A-2 Contact section deposit

114 Field Where Low Wettability Matter was Exposed

113 Oxide Skin

113' Nickel oxide layer

B Boundary line

[Translation done.]

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

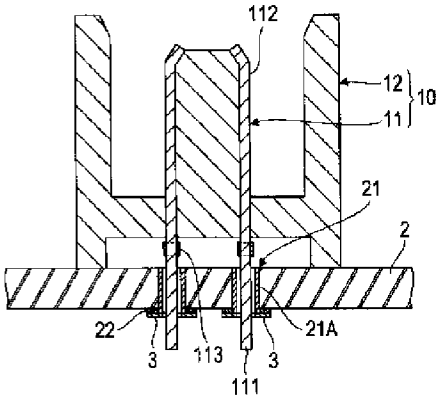


図1

[Drawing 2]

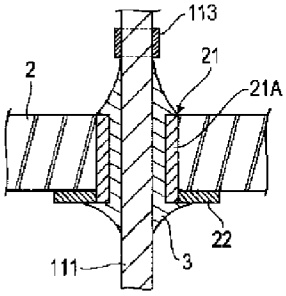


図2

[Drawing 3]

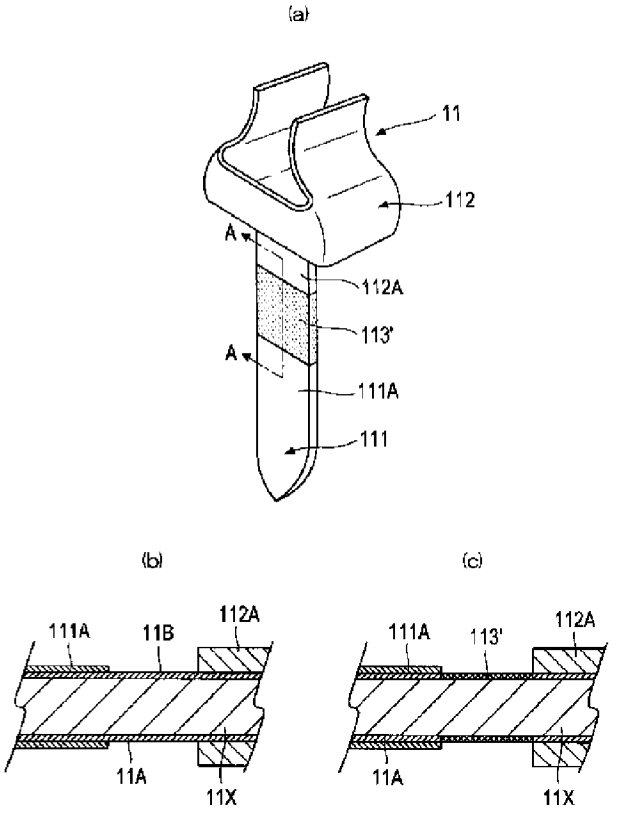
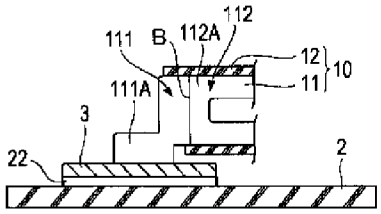

(a)
11
112
A
112A
113'
A
111A
111
(b)
(c)
111A
11B
112A
11A
11X
111A
113'
112A
11A
11X

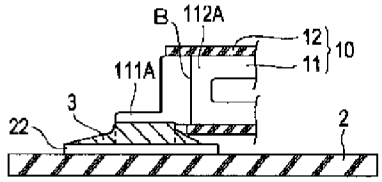
図3

[Drawing 4]

(a)



(b)



(c)

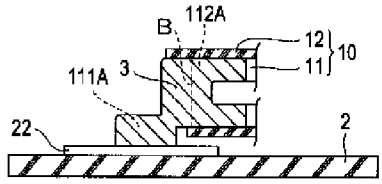
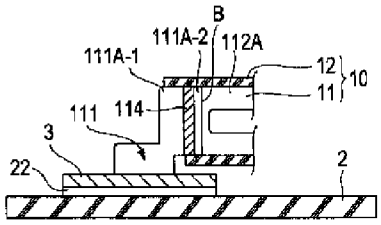


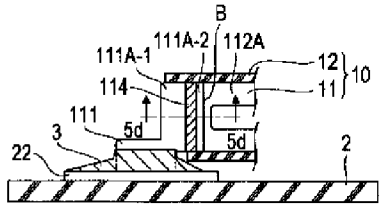
図4

[Drawing 5]

(a)



(b)



(c)

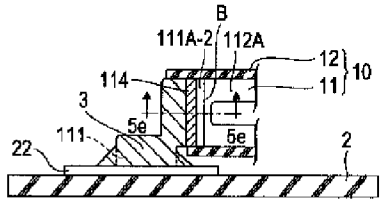


図5

[Drawing 6]

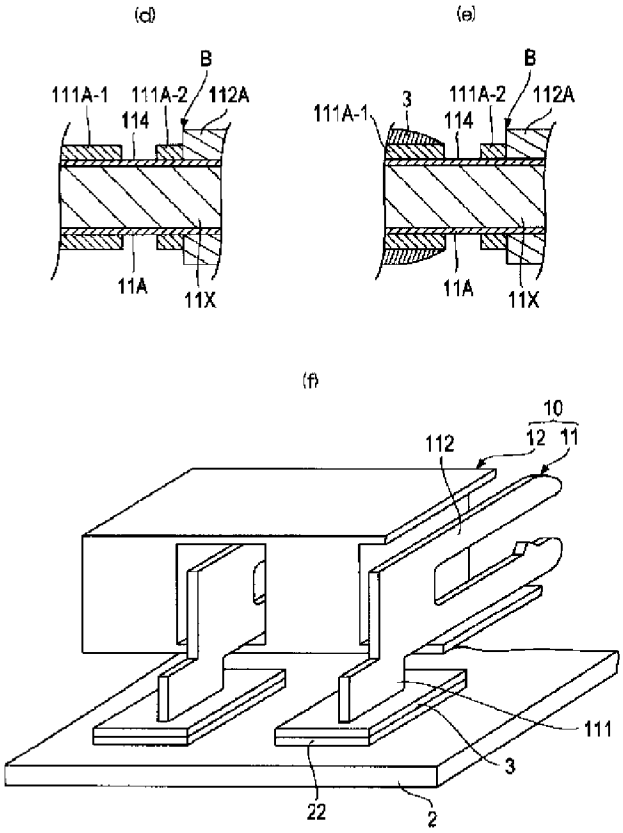


図6

[Drawing 7]

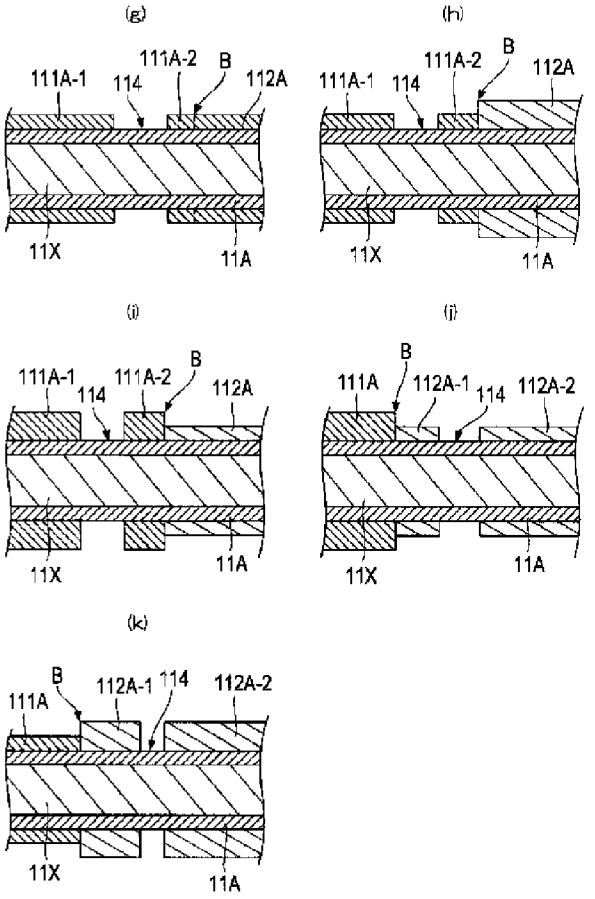

(g)
111A-1
114
111A-2
B
112A
11X
11A
(h)
111A-1
114
111A-2
B
112A
11X
11A
(i)
111A-1
114
111A-2
B
112A
11X
11A
(j)
111A
B
112A-1
114
112A-2
11X
11A
(k)
111A
B
112A-1
114
112A-2
11X
11A

図7

[Drawing 8]

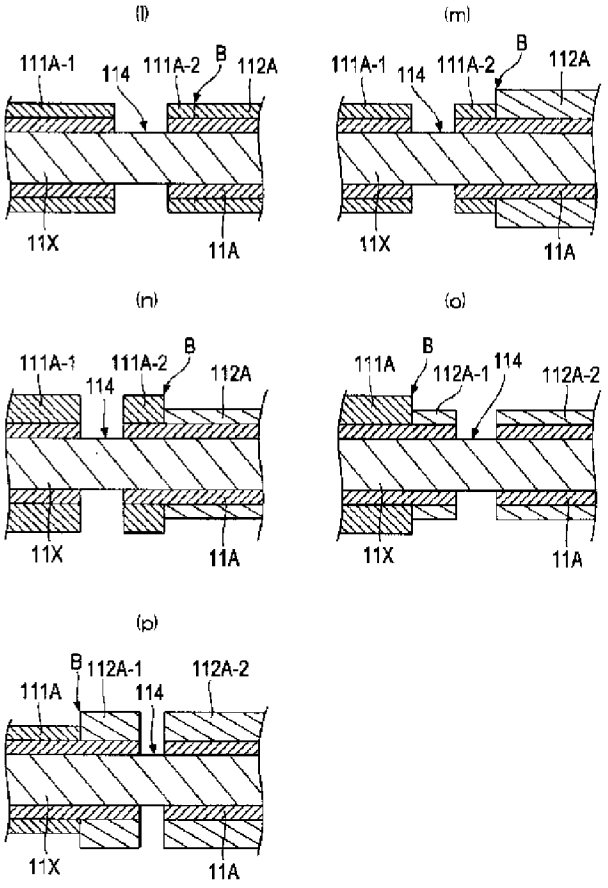
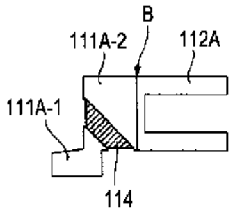

(l)
111A-1
114
111A-2
B
112A
11X
11A
(m)
111A-1
114
111A-2
B
112A
11X
11A
(n)
111A-1
111A-2
B
114
112A
11X
11A
(o)
111A
B
112A-1
114
112A-2
11X
11A
(p)
B
112A-1
112A-2
111A
114
11X
11A

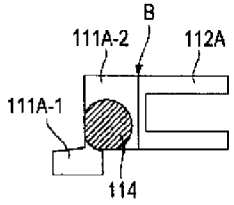
図8

[Drawing 9]

(q)



(r)



(s)

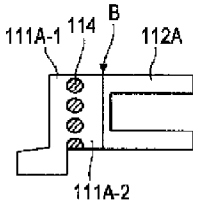


図9

[Drawing 10]

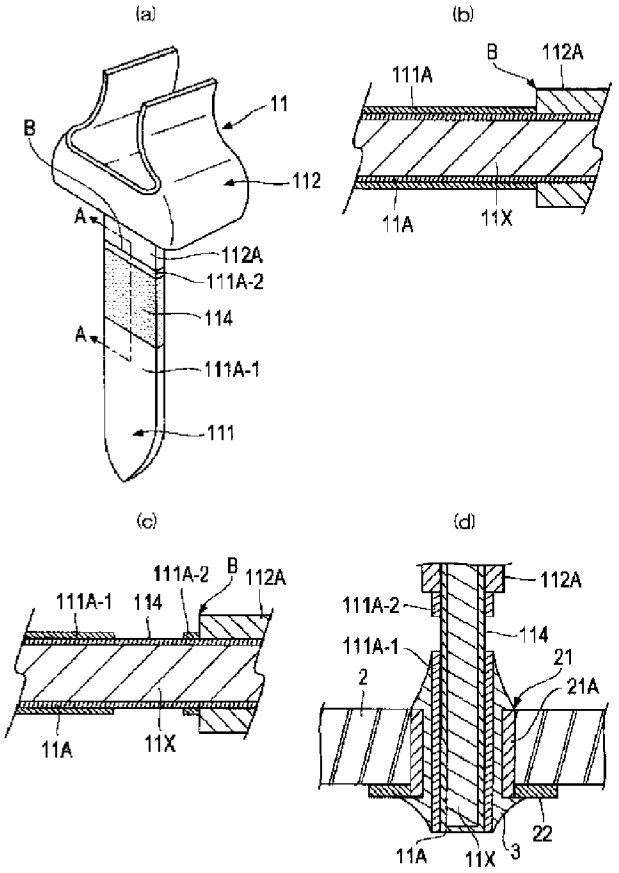


図10

[Translation done.]

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Ｈ０１Ｒ　12/32		Ｈ０１Ｒ　9/09	Ｂ　５Ｅ０７７

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(33)優先権主張国　日本（ＪＰ）

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最終頁に続く

(54)【発明の名称】　電子部品およびその製法

(57)【要約】
【課題】溶接鑞剤の這い上がりを阻止する。
【解決手段】　電子部品用コンタクトの素材または下地メッキ層を溶接鑞剤の低濡れ性物質で構成し、その表面に溶接鑞剤の高濡れ性物質で構成した仕上げメッキ層を形成し、高濡れ性仕上げメッキ層の一部領域を選択的に取り除いて低濡れ性素材表面或いは下地メッキ層表面の露出された領域を形成し、この露出された領域を、加熱溶融した溶接鑞剤が高濡れ性仕上げメッキ層に沿って這い上がり移動するのを阻止する領域として用いる。

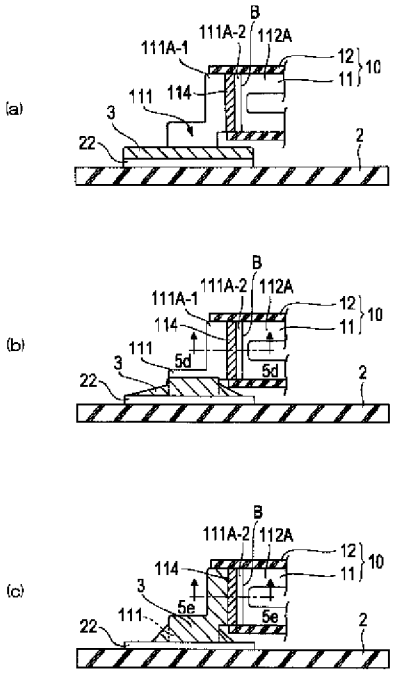

図5

【特許請求の範囲】
【請求項１】　鑞接される端子部および接触部を持ったコンタクトを具備した電子部品であって、
上記コンタクトは、溶接鑞剤に対する低濡れ性表面を持った素材と、上記素材のその表面上に形成され溶接鑞剤に対する高濡れ性を持った物質で構成された仕上げメッキ層と、端子部の高濡れ性仕上げメッキ層の一部領域を選択的に取り除いて設定された上記素材の低濡れ性表面の露出された領域とを具え、
上記素材のこの低濡れ性表面の露出された領域を、溶接鑞剤の這い上がり阻止領域として使用することを特徴とする。
【請求項２】　請求項１に記載される電子部品であって、
上記低濡れ性表面を構成するように、溶接鑞剤に対する低濡れ性を持った物質で構成された下地メッキ層が上記素材上に形成され、
上記仕上げメッキ層がこの下地メッキ層上に形成され、
上記仕上げメッキ層の一部領域を選択的に取り除いて下地メッキ層を露出させて上記阻止領域を形成したことを特徴とする。
【請求項３】　請求項２に記載される電子部品であって、
上記素材が導体で構成され、
この素材上に形成された下地メッキ層がニッケル合金メッキ層であることを特徴とする。
【請求項４】　請求項２に記載される電子部品であって、
上記素材が非導体で構成され、
この素材上に形成された下地メッキ層が無電解メッキ技術によって形成されたニッケル合金メッキ層であることを特徴とする。
【請求項５】　請求項１に記載される電子部品であって、
上記素材が溶接鑞剤に対する低濡れ性を持った物質で構成され、
上記仕上げメッキ層が素材上に形成され、
上記仕上げメッキ層の一部領域を選択的に取り除いて素材を露出させて上記阻止領域を形成したことを特徴とする。
【請求項６】　請求項１に記載される電子部品であって、
上記素材が溶接鑞剤に対する低濡れ性を持った物質で構成され、
下地メッキ層が上記素材上に形成され、
上記仕上げメッキ層がこの下地メッキ層上に形成され、
上記仕上げメッキ層の一部領域と上記下地メッキ層の一部領域とを選択的に取り除いて上記素材を露出させて上記阻止領域を形成したことを特徴とする。
【請求項７】　鑞接される端子部および接触部を持ったコンタクトを具える電子部品の製造方法であって、
上記コンタクトの素材を溶接鑞剤に対する低濡れ性を持った物質で構成し、
この素材上に溶接鑞剤に対する高濡れ性を持った物質で構成した仕上げメッキ層を形成し、
端子部の高濡れ性仕上げメッキ層の一部領域を機械的加工技術により選択的に取り除いて低濡れ性素材の露出領域を形成し、
この低濡れ性素材の露出領域を溶接鑞剤の這い上がり阻止領域として使用することを特徴とする。
【請求項８】　請求項７に記載される方法であって、
上記仕上げメッキ層の形成に先だって上記素材上に、溶接鑞剤に対する高濡れ性を持った下地メッキ層を形成し、
上記仕上げメッキ層は、上記下地メッキ層上に形成するものとし、
上記露出領域は、端子部の仕上げメッキ層の一部領域と下地メッキ層の一部領域とを機械的加工技術により選択的に取り除くものとしたことを特徴とする。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】この発明は、鑞接用コンタクトを持った電子部品およびその製法に関し、特に、コンタクトに、その表面に形成される溶接鑞剤の高濡れ性皮膜である仕上げメッキ層上を這い上がる溶接鑞剤の這い上がりを阻止する領域を形成する新規な方法、及びかかる阻止領域を持った電子部品に関する。
【０００２】
【従来の技術】従来例を図１及び２を参照して説明する。電子部品１０は、コンタクト１１と、このコンタクト１１を一体にモールド成型して保持した絶縁材料より成る端子保持部材１２とから成り、コンタクト１１は、配線基板２に形成される貫通孔２１の内周部に形成された貫通孔メッキ層２１Aに鑞付けされる端子部１１１と他の電子部品に電気接触する接触部１１２より成る。３は配線基板２の下面に形成された配線（図示せず）の鑞接パッド２２に予め付与されている半田の如き溶接鑞剤を示す。
【０００３】コンタクト１１の端子部１１１は、その表面に溶接鑞剤の高濡れ性物質である錫或いは金がメッキされている。この端子部１１１を配線基板２のメッキ層２１Aを持った貫通孔２１に挿入した状態（図１）で、配線基板２の下面に付与されている溶接鑞剤３を加熱溶融することにより、端子部１１１と貫通孔メッキ層２１A及び鑞接パッド２２は電気機械的に鑞接で接続され、電気端子１は配線基板２に実装されて、電子部品１０を構成する。この鑞付けに際して、加熱溶融した溶接鑞剤３は、端子部１１１の表面の高い濡れ性を持ったメッキ層を濡らしながら吸い上げられ（以下これを「這い上がり」と称する）、端子部１１１と貫通孔メッキ層２１A

の間の接合領域における溶接鑞剤３の量が減少する。加熱の回数が複数回にも及ぶと、溶接鑞剤は不足するに到り、端子部１１１と貫通孔メッキ層２１Aの間の電気機械的接続が不完全になる。

【０００４】溶接鑞剤の這い上がりに起因して端子部１１１とメッキ貫通孔２１の間の溶接鑞剤が不足する問題を解消するための一方策として、図１及び２に示される如く、コンタクト１１の端子部１１１の一部の領域に這い上がり阻止用の酸化物被膜領域１１３を形成することが行なわれている（詳細は特開平８－２１３０７０号公報　参照）。即ち、コンタクト１１の端子部１１１の高濡れ性領域を形成している錫メッキ層表面、或いは金メッキ層表面の一部の領域であって、溶融鑞剤が這い上がって到達する部分を帯状に強制酸化して表面層物質の酸化された被膜領域１１３を形成してこの領域を加熱溶融した溶接鑞剤３に濡れない低濡れ性領域にして、加熱溶融した溶接鑞剤３が越えることができない領域としている。

【０００５】しかし、この酸化物被膜は表層を構成する錫の原子或いは金の原子に酸素原子が結合したものに過ぎないので、端子部１１１の表面に被着された錫メッキ層或いは金メッキ層の表面に実際に酸化被膜形成処理が施されているか否か、或いは酸化被膜形成処理が端子部１１１の適正な位置、形状、寸法に施されているか否かを目視により確認することはできない。コンタクトの端子部の溶接鑞剤が不足する問題を解消する他の手法として、図３ａ～３ｃに示した如く、コンタクト１１の全面にニッケルメッキ層１１Ａを下地層として形成した後に、接触部１１２と端子部１１１との間に所定の間隔（０.３ｍｍ）を空けて、接触部１１２には厚く（０.４(ｍ）金メッキ１１２Ａを施し、端子部１１１には鑞付け用として薄く（０.０５(ｍ）金メッキ１１１Ａを施し、両者の間に残されたニッケルメッキ層の露出部１１Ｂを陽極酸化により酸化ニッケル層１１３’として溶融した鑞剤の這い上がり阻止領域として形成する従来例がある（詳細は特開平１０－２４７５３５号公報　参照）。

【０００６】この酸化ニッケル層１１３’も低濡れ性領域であり、加熱溶融した溶接鑞剤３が越えることができずに、これ以上這い上がり移動することはない。ところが、図３ａ～３ｂの従来例において、この酸化ニッケル層１１３’の幅を０．２ｍｍ未満の狭い幅に形成することは困難である。液体を用いて加工（メッキや塗布加工）することはその位置・範囲の精度が低く、特にメッキ領域の形成位置の精度は、液面を調整したりテープ或いは治具を用いてマスキングすることが必要であり１ｍｍ以下の公差で安定した加工を行うことは困難である。

【０００７】すなわち、形成される酸化ニッケル層の位置および幅の精度は、接触部１１２の金メッキ層の加工位置精度、端子部１１１の鑞付け用金メッキ層の加工位置精度の影響を受けるので、高くはなく、端子長が２ｍｍ以下の微細なコンタクトの場合に量産性に乏しくなる。更に、形成された酸化物被膜は、その処理が行なわれているか否かを、目視により確認することができない。陽極酸化による酸化ニッケル層の加工を接触部１２の金メッキ層、端子部１１１の鑞付け用金メッキ層の形成に先だって実施する場合も同様の問題を生ずる。

【０００８】さらに、他の形式のコンタクトでも問題があることを以下に説明する。図４ａを参照するに、これは配線基板２の表面に鑞接パッド２２を形成し、鑞接パッド２２上に溶接鑞剤３を載置し、この溶接鑞剤３を溶融加熱してコンタクト１１の端子部１１１を鑞接パッド２２に鑞接する従来例である。図４ａに示した従来例の場合は、溶接鑞剤３が加熱溶融されると、図４ｂに示される如く溶融した溶接鑞剤３が、端子部１１１の表面１１１Ａを濡らしながら吸い上げられ、図４ｃに示される如く接触部１１２の表面１１２Ａにも到達してその表面を濡らし、それだけ端子部１１１と鑞接パッド２２の間の接合領域における溶接鑞剤３の量が不足する。なお図においてＢは両表面１１１Ａと１１２Ａの境界線である。

【０００９】

【発明が解決しようとする課題】図１及び２に示された従来例では、形成された酸化物被膜は、その処理が行なわれているか否かを、目視により確認することができないという欠点がある。図３に示された従来例では、メッキ領域の形成位置の精度が低く、安定した加工を行うことは困難であり、微細なコンタクトの場合に量産性に乏しくなる。また形成された酸化物被膜を目視により確認することはできない。図４に示された従来例では、溶接鑞剤３の量が不足する。このように、図１～４に示された従来例において、溶接鑞剤３の這い上がり問題が解消されていないことを説明した。

【００１０】

【課題を解決するための手段】この発明は、上述の溶接鑞剤の這い上がり問題を解消した電子部品およびその新規な製法を提供するものである。本願発明の一つの観点として、コンタクト１１の素材に端子部と接触部とを形成しかつ溶接鑞剤３に対する低濡れ性表面を持たせ、その表面上に溶接鑞剤３に対する高濡れ性物質で構成した仕上げメッキ層を形成し、溶融した鑞剤が這い上がってくる端子部１１１の高濡れ性仕上げメッキ層の一部を選択的に取り除いて素材の低濡れ性表面の露出部１１４を形成し、この露出部を溶融した鑞剤の這い上がりを阻止する阻止部として働かせるように構成した改良したコンタクト１１を得て、この改良したコンタクト１１を用いて基板に鑞接して電子部品１０を構成する。

【００１１】本願発明の他の一つの観点として、コンタクト１１の素材を溶接鑞剤３に対する低濡れ性物質で構成し、この素材の上に下地メッキ層を形成し、その表面

に溶接鑞剤３に対する高濡れ性物質で構成した仕上げメッキ層を形成し、溶融した鑞剤が這い上がってくる端子部１１１の高濡れ性仕上げメッキ層の一部と、その下の下地メッキ層の一部の両方を、選択的に取り除いて低濡れ性物質の素材の露出部１１４を形成し、この露出部を溶融した鑞剤の這い上がり阻止部として働かせるように構成した改良したコンタクト１１を得て、この改良したコンタクト１１を用いて基板に鑞接して電子部品１０を構成する。

【００１２】そして、コンタクト１１の素材１１Ｘを露出させて上記溶融した鑞剤の這い上がり阻止部を形成する場合には、素材の構成材料として、例えばＣｕ、並びにＣｕとＴｉ、Ｂｅ、Ｓｎ、Ｍｇ、Ｎｉ、Ｚｎとの銅合金（Ｐ、Ｓｉなどの添加物を含んでも良い）が使用可能であるが、このほかにＣｏ、Ｍｎ、Ｐｂ、Ａｌ、Ｆｅ、ＳＵＳなどの金属も使用可能である。コンタクト１１の表面に施される仕上げメッキは、たとえば金メッキ、錫或いはＳｎとＡｇ、ＳｎとＣｕ、ＳｎとＣｕ及びＡｇとの錫合金メッキ、鉛或いはＰｂとＳｎとの鉛合金メッキ、Ｐｄ或いはＰｄとＮｉまたはＰｄとＣｏのＰｄ合金が使用可能である。

【００１３】また、本願発明のさらに他の観点として、仕上げメッキ層の形成の前に、素材上に仕上げメッキ層の被着を助成するためのＮｉとＰ、ＮｉとＳ、またはＮｉとＢとのニッケル合金メッキ層から成る下地メッキ層を形成する。そしてこの下地メッキ層の上に高濡れ性物質の仕上げメッキ層を形成する。この下地メッキ層の材質は、溶接鑞剤３に対して低い濡れ性を持った導電材料なので、仕上げメッキ層のみを除去して下地メッキ層を露出させて、この下地メッキ層の露出部によって上記溶融した鑞剤の這い上がり阻止部を形成することもできる。

【００１４】この場合には、素材の構成材料として導電材料に限らず、プラスチックス、セラミックス、ガラスなどの非導電材料も使用できるので、予め、これらの材料を用いて成型によって接触部と端子部をもったコンタクトを形成し、その表面全面に無電解メッキによってニッケル合金の無電解メッキ層を形成し、その上に全面に仕上げ金メッキ層を形成した後に、端子部の仕上げメッキ層の一部を除去して、下地層の露出部を以って鑞剤の這い上がり阻止部を形成する。また、低い濡れ性を持った導電材料で構成した素材の上に高濡れ性物質で構成した下地メッキ層を形成し、その上に仕上げメッキ層を形成した場合には、仕上げメッキ層および下地メッキ層の双方を取り除いて露出部１１４を得る。

【００１５】コンタクト１１の表面に形成された高濡れ性物質のメッキ領域の一部を選択的に取り除いて、低濡れ性表面の露出部１１４を形成する加工は、低濡れ性表面露出部１１４が形成されるべき高濡れ性物質のメッキ領域に、機械的な切削或いは研磨技術、放電加工或いは電子ビーム加工技術、レーザ加工技術を適用する。この加工技術は、良好な加工位置精度で容易に実施することができる。

【００１６】

【発明の実施の形態】この発明の実施の形態を図５～図９に示した電子部品を参照して説明する。なお、従来例で示したものと同一物については同一記号を付す。図６（ｆ）に斜視図で示したように、電子部品１０は、コンタクト１１とインシュレータハウジング１２とからなる。配線基板２の表面には鑞接パッド２２が形成されている。周知の如く、この配線基板２には印刷配線（図示せず）が設けられ、鑞接パッド２２と結合している。なお、図１の如く、印刷配線が基板の裏面（図において基板２の下側）に設けられ、貫通孔と貫通孔メッキ層とを介して基板表面の鑞接パッドに結合するように構成しても良い。

【００１７】そして、鑞接パッド２２上に半田の如き溶接鑞剤３を介して電子部品１０のコンタクト１１の端子部１１１を載置し、この溶接鑞剤３を溶融加熱することにより、配線基板２の表面の鑞接パッド２２に鑞接する。コンタクト１１の素材を導体で構成する場合には、銅合金で構成する。コンタクト１１の表面に施される仕上げメッキは、金メッキ、錫或いは錫合金メッキ、鉛或いは鉛合金メッキの何れかで構成する。そして、仕上げメッキに先だって、コンタクト１１を構成する金属材料に対する仕上げメッキの密着を良好にするために、素材１１Ｘの表面に形成する下地メッキ層１１Ａはニッケル合金メッキ層とする。

【００１８】仕上げメッキ層を一部分除去して下地のニッケル合金メッキ層を露出させた場合、ニッケル合金メッキ層は、本来的に、或いは表面層の除去処理中に自然酸化により、低濡れ性なので、強制的に酸化させなくても、溶融溶接鑞剤３の這い上がりが阻止されることは実験的に確認されている。このため酸化被膜形成の確認作業を必要としない。更に、低濡れ性物質の露出部１１４は、コンタクト１１の端子部１１１の表面に形成された鑞接用仕上げメッキ層１１１Ａの一部で接触部１１２に近い部分であって、従来鑞剤が這い上がってくる領域に帯状形状で、所定幅寸法に形成し、この露出部によって端子部の仕上げメッキ層が１１１Ａ－１と１１１Ａ－２とに２分される。

【００１９】このコンタクトの第１の実施例は、図５～図６に示す。図５（ａ）を参照するに、これは配線基板２の表面に形成された鑞接パッド２２に溶接鑞剤３が載置され、溶接鑞剤３表面に仕上げメッキを施されたコンタクト１１の端子部１１１が係合せしめられた非加熱の状態を示す。図５（ｂ）は、溶融した溶接鑞剤３が端子部１１１の表面を濡らしながら這い上がり始めたところを示している。なお、端子部１１１と接触部１１２とは、この実施例においては、接触部１１２が外部とより

良好に接触するように、接触部１１２の仕上げメッキ層１１２Ａの材質及びメッキ層厚を端子部１１１の仕上げメッキ層１１１Ａの材質及びメッキ層厚と異ならせ、したがって、端子部１１１仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａの間に、境界線Ｂがあるものとして示す。

【００２０】図６（ｄ）は、図５（ｂ）の５ｄ－５ｄ線における断面図である。図５（ｃ）は溶融した溶接鑞剤３が端子部１１１の表面を濡らし、この発明による低濡れ性露出部１１４に到達してこれを越えることができないことを示し、溶融した溶接鑞剤３がこれ以上這い上がり移動することはない。図６（ｅ）は、図５（ｃ）の５ｅ－５ｅ線における断面図である。ここで、従来例の如く低濡れ性露出部１１４が存在しない場合、図４（ｃ）を参照するに、端子部１１１の全表面に到達した溶融溶接鑞剤３は更に接触部１１２表面を這い上がるので、端子部１１１と鑞接パッド２２の間の接合領域における溶接鑞剤３の量が不足するが、本願発明に依れば低濡れ性露出部１１４を形成することによりこの更なる這い上がり移動は阻止される。

【００２１】図７（ｇ）～（ｋ）に、露出部１１４の各種の形成方法を示す。ここでは、低濡れ性物質で構成された下地メッキ層１１Ａを露出部１１４として露出させる場合であり、この場合には素材の材質は導体、非導体の区別なくあらゆる物質が使用できる。この実施例においては、コンタクト１１の表面に形成される高濡れ性物質で構成された仕上げメッキ層のうち、端子部１１１の領域１１１Ａの一部を帯状に選択的に取り除き、端子部１１１の下地メッキ層を露出させて低濡れ性露出部１１４を形成する。

【００２２】図７（ｇ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが同一材質、同一厚さに形成し、下地メッキ層の露出部１１４を端子部１１１の仕上げメッキ層１１１Ａの領域内に形成した場合を示す。この場合には境界線Ｂは実際には存在しない。図７（ｈ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より薄く形成し、下地メッキ層の露出部１１４を端子部１１１の仕上げメッキ層１１１Ａの領域内に形成した場合を示す。（この図は図６（ｄ）と同じ）

図７（ｉ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より厚く形成し、下地メッキ層の露出部１１４を端子部１１１の仕上げメッキ層１１１Ａの領域内に形成した場合を示す。

【００２３】図７（ｊ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より厚く形成し、下地メッキ層の露出部１１４を接触部１１２の仕上げメッキ層１１２Ａの領域内に形成した場合を示す。図７（ｋ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より薄く形成し、下地メッキ層の露出部１１４を接触部１１２の仕上げメッキ層１１２Ａの領域内に形成した場合を示す。

【００２４】図８（ｌ）～（ｐ）は、低濡れ性表面を持つ素材１１Ｘを露出部１１４として露出させる場合であり、端子部１１１の仕上げメッキ層およびその下に形成されている下地メッキ層を両方とも選択的に一部除去して素材の表面を露出させる。この場合には素材の材質は低濡れ性の導体が望ましいが、例えばレーザー照射によるメッキ層の一部除去工程によって低濡れ性をもつに至るような物質を使用することも可能である。　また、下地メッキ層の材質は、その濡れ性に限定はない。

【００２５】図８（ｌ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが同一材質、同一厚さに形成し、素材１１Ｘの露出部を端子部１１１の仕上げメッキ層１１１Ａの領域とその下の下地層を共に一部除去して形成した場合を示す。この場合には境界線Ｂは実際には存在しない。図８（ｍ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より薄く形成し、素材１１Ｘの露出部１１４を端子部１１１の仕上げメッキ層１１１Ａの領域とその下の下地層を共に一部除去して形成した場合を示す。

【００２６】図８（ｎ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より厚く形成し、素地１１Ｘの露出部１１４を端子部１１１の仕上げメッキ層１１１Ａの領域とその下の下地層を共に一部除去して形成した場合を示す。図８（ｏ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より厚く形成し、素地１１Ｘの露出部１１４を接触部１１２の仕上げメッキ層１１２Ａの領域とその下の下地層を共に一部除去して形成

した場合を示す。

【００２７】図８（ｐ）は、端子部１１１の仕上げメッキ層１１１Ａと接触部１１２の仕上げメッキ層１１２Ａとが異種の材質または、同一材質であっても端子部１１１の仕上げメッキ層１１１Ａの膜厚を接触部１１２の仕上げメッキ層１１２Ａの膜厚より薄く形成し、素地１１Ｘの露出部１１４を接触部１１２の仕上げメッキ層１１２Ａの領域とその下の下地層を共に除去して形成した場合を示す。なお、これら図７または図８において、下地メッキ層が存在しない場合には、仕上げメッキ層のみを削除することによって、素材１１Ｘの露出部１１４を形成できることは容易に理解できるであろう。

【００２８】また、低濡れ性表面の露出部１１４を形成するために、本願発明では、レーザー光の照射による仕上げメッキ層の除去方法を開示したがこれ以外の除去方法も使用できることも理解できるであろう。またここで露出部１１４を形成する位置、及びその形状も、帯状に限るものではない。例えば、図９（ｑ）～（ｓ）に示す如く、端子部１１１の領域に形成することが望ましい。

【００２９】なお、図９（ｓ）に示した如く、露出部を複数個形成し、隣り合った露出部間に残された鑞材の流路となる高濡れ性仕上げメッキ層の狭められた領域を形成することによっても、実質的に鑞材の這い上がりを阻止することができる。同じように、この露出部１１４が、帯状に形成される場合であっても、端子部１１１を一周することが望ましいが、完全に連続して一周することなく、不連続であっても、その不連続部が、狭められた這い上がり領域を形成していれば、這い上がり阻止の効果がある。

【００３０】図１０に本願発明の他の実施例を示す。この実施例は、図３に示した従来例のコンタクトを改良したものである。（図１０（ａ））この実施例においても、他の図面に示したものと同一物は同一符号を付す。この従来例が前述した如く、メッキ技術を用いて、ニッケルメッキ層の下地層１１Ａをコンタクト１１の素材表面に形成した後、所定の間隔（０.３ｍｍ）を持った露出部１１Ｂとして露出させるように、上記所定の間隔だけ空けて接触部１１２用の厚い（０.４(ｍ）金メッキ部１１２Ａと端子部１１１鑞付け用の薄い（０.０５(ｍ）金メッキ部１１１Ａを形成し（図３（ｂ））、その後上記ニッケルメッキ層の露出部を陽極酸化によって酸化ニッケル層１１３’を形成し（図３（ｃ））、これを溶融鑞剤の這い上がり阻止領域として用いているのに対し、本願発明においては、図１０（ｂ）に示す如く、コンタクト素材１１Ｘの表面に下地層１１Ａを形成した後、接触部１１２側には接触用の金メッキ部１１２Ａと、端子部１１１側には鑞付け用の金メッキ部１１１Ａを形成する。この時両者の間には従来例のように所定の間隔だけ空けることは要しない。

【００３１】次いで、図１０（ｃ）に示す如く、端子部側の金メッキ部１１１Ａの接触部に近い領域にレーザ加工技術を適用して、帯状に端子部表面を一周するように金メッキ部１１１Ａを除去して下地層１１Ａを露出させ低濡れ性露出部１１４を形成する。これにより、金メッキ部１１１Ａが、２つの部分１１１Ａ－１と１１１Ａ－２に２分される。このコンタクトを、図２の如く貫通孔２１と、貫通孔メッキ層２１Ａと、溶接鑞剤３とを持った基板２に装着し、鑞剤３を溶融したとき、この鑞剤３は、２分された端子部側金メッキ部の一方１１１Ａ－１を這い上がってくるが、図１０（ｄ）に示す如く低濡れ性露出部１１４によってそれ以上の這い上がりが阻止され、２分された端子部側金メッキ部の他方１１１Ａ－２及び接触部側金メッキ部１１２Ａには到達しない。

【００３２】なお、低濡れ性露出部１１４の形成位置は、端子部側金メッキ部１１１Ａと接触部側金メッキ部１１２Ａの接合領域に形成しても、或いは、接触部側金メッキ部１１２Ａの端子部に近い領域に形成しても良い。

【００３３】

【発明の効果】この発明によれば、電子部品のコンタクトにおいて、その溶接鑞剤に対する高い濡れ性の表面層を選択的に一部除去し、低濡れ性の表面を持った下地メッキ層或いは素地を露出させることにより、低濡れ性表面の露出部１１４を形成し、溶接鑞剤の這い上がりをその箇所で阻止することができる。なお、これまで素材は低濡れ性表面を有するものと言う説明において、下地メッキ層は別体として説明してきたが、下地メッキ層が素材と一体となったものを以って素材と考えることもできる。この考えによれば、下地メッキ層の表面が、素材の表面と定義できる。

【００３４】この低濡れ性表面の露出部の形成位置精度および幅精度についても、下地メッキおよび仕上げメッキ加工精度に影響を受けず、コンタクトの基準寸法から適正な低濡れ性露出部形成位置を直接に測定設定し、そこに先の加工技術を適用することにより、高濡れ性皮膜の除去位置および範囲を高精度で加工して低濡れ性露出部を得ることができる。また、メッキ、塗布の如く液体による加工技術と比較して、高濡れ性皮膜の除去の如く固体を取り扱う加工技術はその位置精度および、範囲の精度を高める上において好適な技術であり、量産性を向上することができる。更に、除去形成した低濡れ性露出部の位置および範囲を目視で容易に確認することができるので、寸法管理も容易に実施することができ、量産性が向上する。

【図面の簡単な説明】

【図１】１つの従来例を説明する図。

【図２】図１の部分拡大図

【図３】他の従来例を説明する図。

【図４】更なる他の従来例を説明する図。

【図５】この発明の１つの実施例を説明する図。

【図６】この発明の実施例を更に説明する図。
【図７】この発明の実施例を更に説明する図。
【図８】この発明の実施例を更に説明する図。
【図９】この発明の実施例を更に説明する図。
【図１０】この発明の他の実施例を説明する図。
【符号の説明】
２　　配線基板
３　　溶接鑞剤
１０　　電子部品
１１　　コンタクト
１１Ａ　下地ニッケルメッキ層
１１Ｂ　下地ニッケルメッキ層の露出部
１１Ｘ　素材
１２　　端子保持部材
２１　　貫通孔
２１Ａ　貫通孔メッキ層
２２　　鑞接パッド
１１１　　端子部
１１１Ａ、１１１Ａ-１、１１１Ａ-２　端子部メッキ層
１１２　　接触部
１１２Ａ、１１２Ａ-１、１１２Ａ-２　接触部メッキ層
１１４　　低濡れ性物質の露出された領域
１１３　　酸化被膜
１１３’　酸化ニッケル層
Ｂ　　境界線

【図１】

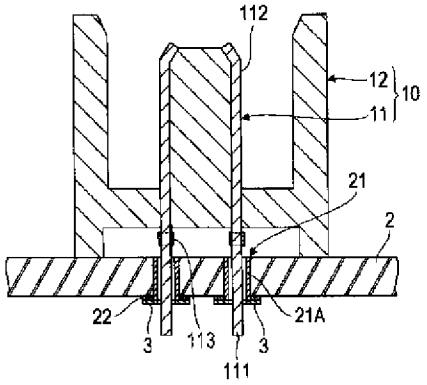

図1

【図２】

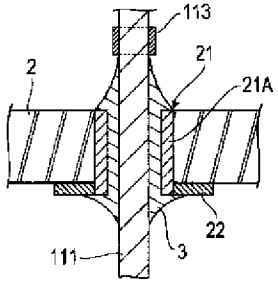

図2

【図3】

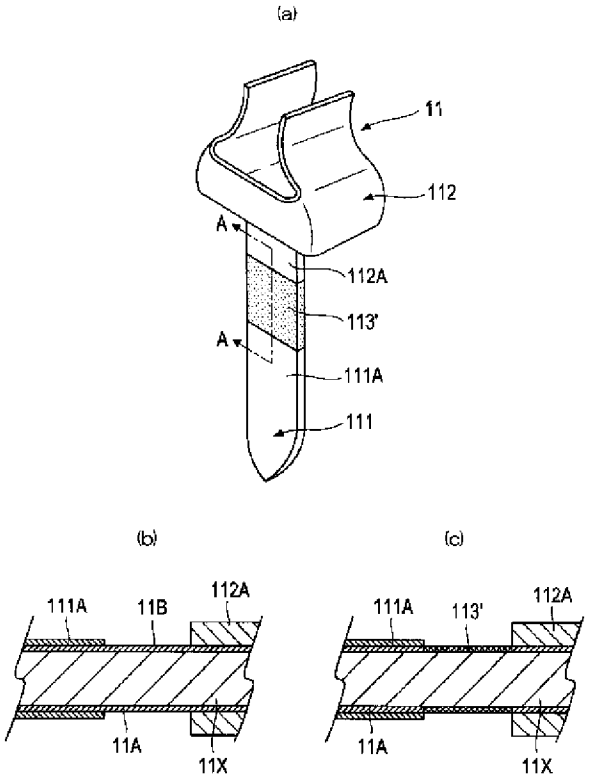
(a)
11
112
A
112A
113'
A
111A
111
(b)
111A
11B
112A
11A
11X
(c)
111A
113'
112A
11A
11X

図3

【図4】

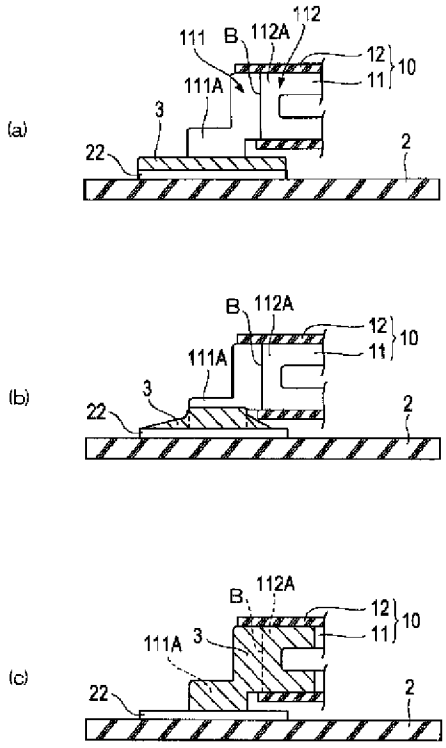
(a)
112
111
B
112A
12
10
11
111A
3
22
2
(b)
B
112A
12
10
11
111A
3
22
2
(c)
B
112A
12
10
11
111A
3
22
2

図4

【図5】

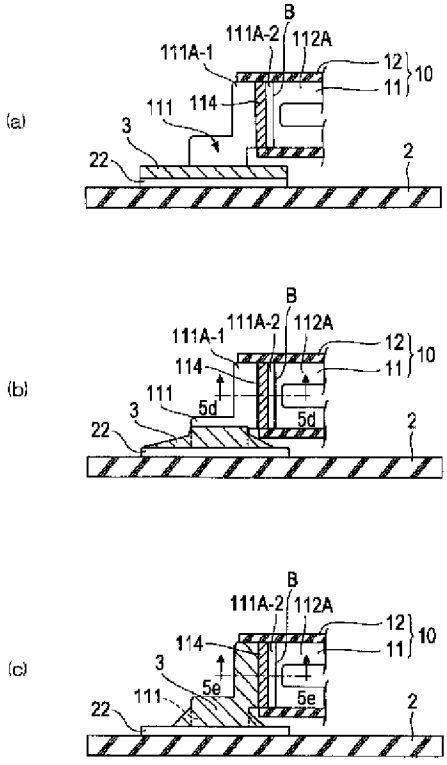
(a)
B
111A-2
112A
111A-1
12
11
10
111
114
3
22
2
(b)
5d
(c)
5e

図5

【図6】

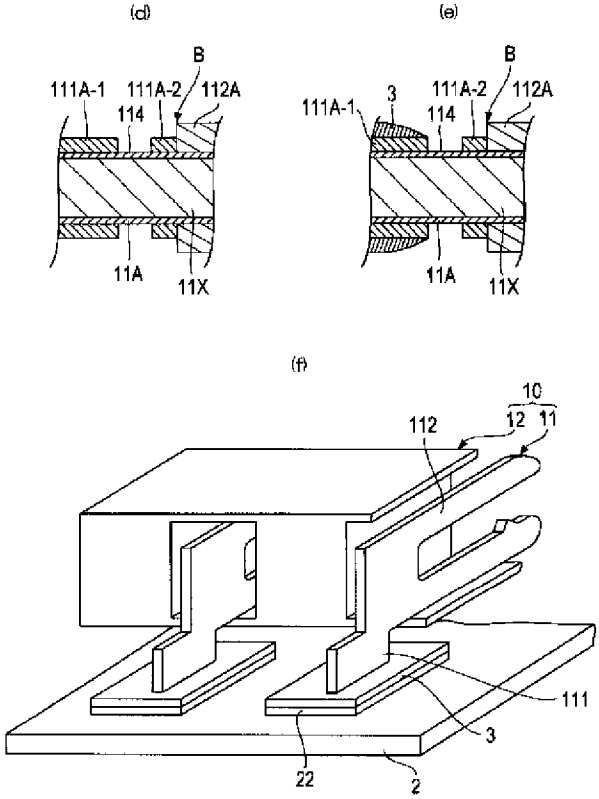
(d)
(e)
B
111A-1
111A-2
112A
114
3
11A
11X
(f)
10
12
11
112
111
22
2

図6

【図7】

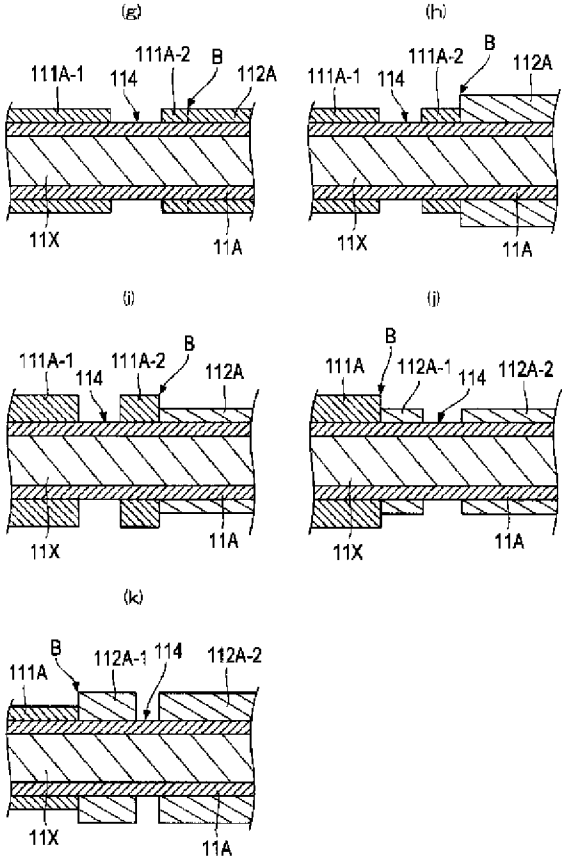
(g)
111A-1
114
111A-2
B
112A
11X
11A
(h)
111A-1
114
111A-2
B
112A
11X
11A
(i)
111A-1
114
111A-2
B
112A
11X
11A
(j)
111A
B
112A-1
114
112A-2
11X
11A
(k)
111A
B
112A-1
114
112A-2
11X
11A

図7

【図8】

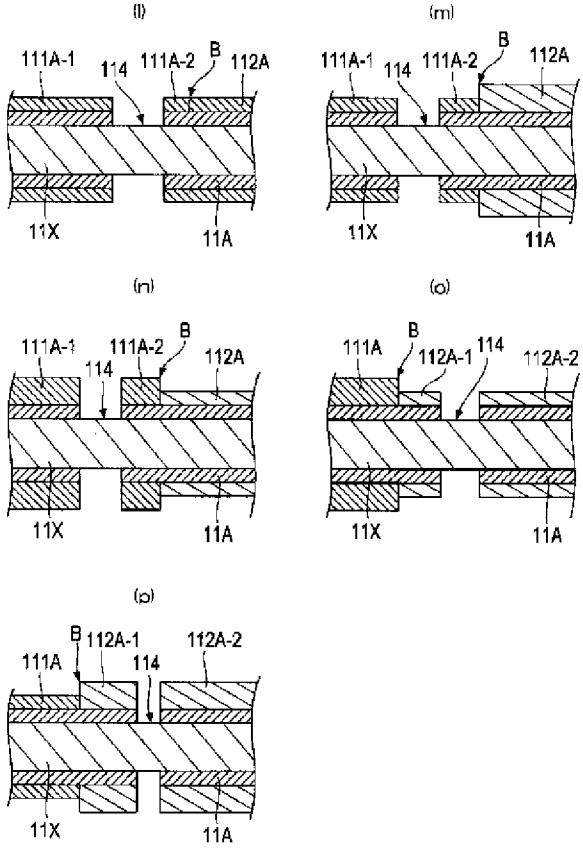
(l)
111A-1
114
111A-2
B
112A
11X
11A
(m)
111A-1
114
111A-2
B
112A
11X
11A
(n)
111A-1
114
111A-2
B
112A
11X
11A
(o)
111A
B
112A-1
114
112A-2
11X
11A
(p)
111A
B
112A-1
114
112A-2
11X
11A

図8

【図９】

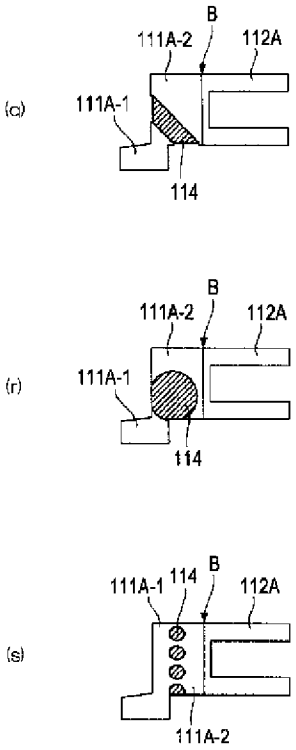

図9

【図１０】

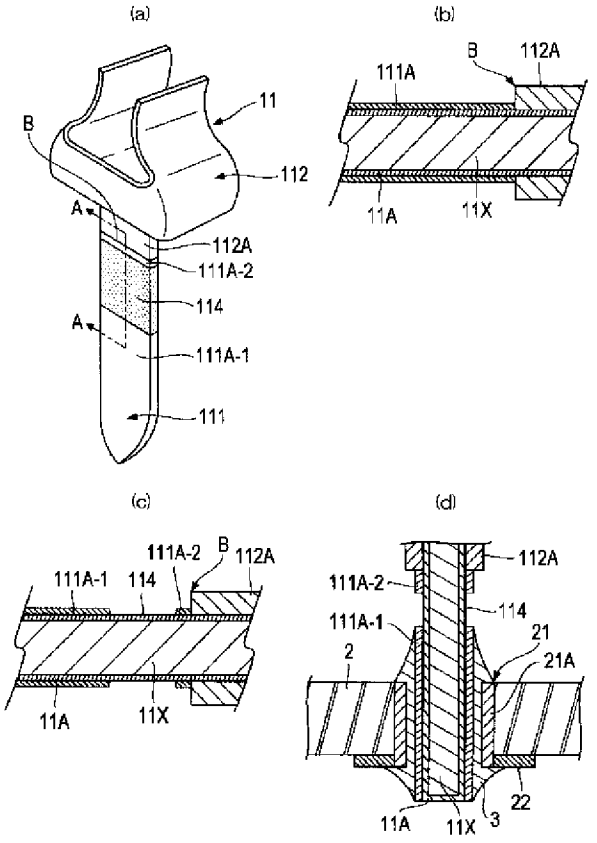

図10

フロントページの続き

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